

CITY UTILITIES DESIGN STANDARDS MANUAL

**Book 6
CADD Standards (CADD)
CADD5 Drafting Conventions**

June 2015

CADD5.01 Purpose

This Chapter establishes the minimum standards for drafting conventions as related to Computer Aided Design and Drafting (CADD) work performed by or for City Utilities Engineering (CUE).

Drafting conventions provide standard formats for graphics and text information, ensure visual consistency and provide ease of data reusability within CADD drawings. They build on and shall conform to the standards, tools, and guidelines of the NCS Version 5, UDS modules 4.0 and 7.0.

CADD5.02 General

CADD files shall be prepared in a neat, uniform manner. All lettering and lines shall be of an adequate weight and well-spaced in order to provide clarity and composition to the drawings. Information shall follow the CADD Standards and be presented in such a manner that it will be legible when the plans are viewed, scanned, reproduced, or reduced.

Consistent styles and standard lettering shall be used throughout any given sheet.

All general notations pertaining to proposed items shall be lettered in upper case; however, any lengthy sentence or phrase pertaining to proposed items may be lettered in upper and lower case. General notations pertaining to existing items shall be lettered in upper and lower (sentence) case where only the first letter is capitalized.

Generally, a noticeable and distinguishable difference between existing and proposed items shall be evident. For example, existing items shall be shown with “lighter”, thinner lines and proposed items shall be shown with “darker”, bolder lines.

CADD5.03 Drawing File Scale

A consistent scale shall be used throughout projects. Figure CADD5.1 shows standard drawing scales and their typical uses.

All plan views within sheets shall include a graphic bar scale at the upper right corner of the view directly below the “north arrow”. Standard graphic bars are located in [Chapter CADD7 - Symbols](#).

All profile views within sheets shall include a horizontal and vertical numeric (textual) scale at an appropriate location of the view noted as “Hor. Scale:” and “Vert. Scale”, both followed by the view numeric scale. The preferred location is at the upper right corner of the profile drawing view.

All cross section views within sheets shall include a horizontal and vertical numeric (textual) scale at an appropriate location of the view noted as “Hor. Scale:” and “Vert. Scale:” both followed by the view numeric scale. The preferred location is at the center of the cross section view.

All drawing views within sheets which are not to scale, shall include a numeric (textual) scale at an appropriate location of the view noted as "Scale: N.T.S.". The preferred location is at the upper right corner of the view.

1. Model Files

Model files shall be created at full 1:1 scale.

2. Sheet Files

Sheet files shall use the typical scales shown in Figure CADD5.1 unless otherwise specified. Generally, horizontal scale should be the same for plan view and profile view within plan and profile (P&P) sheets.

Figure CADD5.1 Typical Drawing Plot Scales

Drawing View Type	Typical Plot Scales	Scale Type
Plan Views	1" = 20'	Horizontal
Profile Views	1" = 20'	Horizontal
	1" = 5'	Vertical
Cross Sections Views	1" = 20'	Horizontal
	1" = 5'	Vertical
Site Plans and Maps	1"=20' up to 1" =5000'	Horizontal
Interior Elevations	1/4" = 1'-0"	N/A
	1/8" = 1'-0"	N/A
Exterior Elevations	1/8" = 1'-0"	N/A
	3/32" = 1'-0"	N/A
Detail Views	Not to Scale	Horizontal
	Not to Scale	Vertical

CADD5.04 Presentation Graphics

1. Alignments and Stationing

Alignment Stationing shall be located on the centerline of the pipe or project improvement route. It shall begin at 0+00 and increase in value as it approaches the end of the project improvement route. Negative stationing will not be accepted to define the alignment centerline. Alignments and Stationing shall begin at least ten (10) feet prior to the beginning of the project improvement route. One hundred foot stations and fifty foot tick marks shall be shown as part of the project drawings.

A. Force Main and Gravity Sewer Drawings

Project alignment and stationing shall begin at the downstream end and increase in value as it approaches the upstream end.

B. Other Drawings

Project alignment and stationing shall begin at the West or South end of the project improvement (route) and increase in value as it approaches the East or North end.

2. Orientation

A. Model File Drawings

Model File Drawings shall be oriented so that the entire project area and model is created in (Autodesk) model space and all other requirements of the CADD Standards are met.

B. Sheet File Drawings

Sheet File Drawings shall be oriented so that the entire project area is shown on one drawing view if possible. If not possible, standard match lines shall be used to designate which sheet or view the project continues on.

Drawing views shall be oriented so that north is toward the top or the right of the sheet if practical. The most appropriate method which allows more of the project improvement (route) to be viewed shall be used.

Drawing views shall be oriented so that the project improvement route is as parallel as possible with the edges of the sheet title block and centered within the view.

The plan view generally should be shown on the same sheet as the profile view with the plan view located at the top of the sheet and the profile view at the bottom. The alignment stationing on the plan view shall line up horizontally with the profile view within the sheet when possible. Profile views shall be oriented so that alignment stationing begins at the left side of the sheet and stationing increases as it approaches the right of the sheet.

A sample plan and profile sheet is available in [Exhibit CADD5-7](#).

Cross-section views shall be shown with sections looking up station and placed on the sheet progressing from the bottom of the sheet for lower stations to the top of the sheet for higher stations and left to right if more than one column of cross-sections is presented.

C. Maps

Vicinity and location maps shall be oriented with north toward the top of the sheet.

3. North Arrow

The North Arrow (True North) shall be rotated to correspond to the drawing orientation within sheet file drawing views. It shall be located on the upper right corner of the drawing view it corresponds to.

4. Line Widths (Lineweights)

To visually improve readability and clarity, drawing objects shall be set to use line widths as specified in Chapter CADD6 - Layers. Figure CADD5.2 shows Line Width guidelines when creating new layers. Typically, Extra Fine or Fine line widths shall be used for existing items and proposed

items shall be set to use thicker line widths. Object Line widths within CADD files shall be set to use “By Layer”.

Figure CADD5.2 Line Width Guidelines & Comparison

Line Width Name	Line Width (in.)	Line Width (mm.)	Typical Line Width Use
Extra Fine	0.005	0.13	Existing object lines, Minor Grid lines, Existing item labels and notes, Fine detail not achievable with Fine lines
Fine	0.007	0.18	Existing object lines, Hatching, patterning and material indicators
Thin	0.010	0.25	Existing object lines, Dimension lines, leaders, extension lines, break lines, grid lines, schedule minor grid lines, hidden objects, center lines, phantom lines and setback lines
Medium	0.014	0.35	Proposed object lines, text, property lines, terminator marks, schedule grid accent lines
Wide	0.020	0.50	Major object lines, cut lines, section cutting plane lines, property lines, drawing block borders, and titles
Extra Wide	0.028	0.70	Minor title underlining, footprints, match lines, schedule outlines, sheet borders, large titles, and object lines requiring special emphasis
XX Wide	0.040	1.00	Major title underlining and separating portions of drawings
XXX Wide	0.055	1.40	Border sheet outlines and cover sheet line work
XXXX Wide	0.079	2.0	Border sheet outlines and cover sheet line work

5. Line Types

To improve readability and clarity, drawing objects shall be set to use line types specified in [Chapter CADD6 - Layers](#). Proposed items shall be set to use the continuous linetype.

Standard linetypes shall be found in CUE-provided (.LIN) linetype files and presented graphically in [Chapter CADD7 - Symbols](#). All object linetypes within CADD files shall be set to use “By Layer” linetype.

6. Object Colors

Object colors shall be in accordance with those specified within CUE CADD Layers and NCS v.5.0 and shall be used to aid working with graphics and items on a computer screen. Yellow color shall not be used.

When assigning colors, default AutoCAD screen colors and their corresponding Red, Green and Blue (RGB) values shall be used. It is recommended to use colors within [Chapter CADD 6 - Layers](#) for similar or related items.

All object colors within CADD files shall be set to use “By Layer” color.

7. Plotting and Publishing

Drawing files shall use CUE-provided plot styles, standard (sheet) paper sizes, margins, and plot settings. Plot area shall consist of the sheet file layout (Autodesk paper space) and be plotted at 1” = 1’ scale.








Plotting and publishing shall be independent of color for plotted line widths and follow line widths designated within each object's CADD layer.

CUE AutoCAD/Civil 3D DWG and DWT templates have pre-defined page setups, paper sizes, plot offsets and listed plot styles. Engineer shall verify all settings to ensure proper plotting, publishing and file output.

Color and/or black and white, DWF and PDF plot files shall be created for each design/review phase as instructed.

- Color plotting and Publishing shall use the CUE-provided plot style files for color plots. The colors used shall be default AutoCAD screen colors.
- Black and White plotting and Publishing shall use a revised version of NCS v.5.0 Black/White/Gray Plotting Guidelines and the CUE-provided plot style file. With the exception of Screened colors, the colors used shall be those shown on Figure CADD5.3 Black, White, Gray Plotting and Publishing Guidelines with the exception of Screened colors. Due to the difficulty in scanning, screened colors which result in Gray plotted color shall not be used unless absolutely necessary and authorized.

Figure CADD5.3 Black, White, Gray Plotting and Publishing Guidelines

Color Number			Plotted Color	Plotted RGB Values			Screening	
NCS	AutoCAD	MicroStation		Red	Green	Blue	Percent	Output
1-249	1-249	1-249	Black	0	0	0	100	
250	250	250	Gray	102	102	102	60	
251	251	251	Gray	128	128	128	50	
252	252	252	Gray	153	153	153	40	
253	253	253	Gray	179	179	179	30	
254	254	254	Gray	204	204	204	20	
255	255	255	Background (White)	N/A	N/A	N/A	0	

8. Hatching (Patterning)

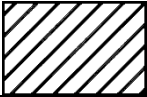


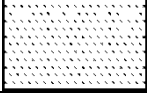
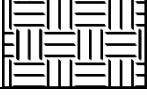
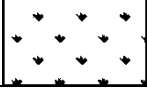
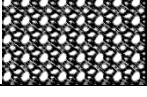
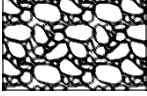
Hatching may be used to draw attention to or designate a material to design areas in plan, section or detail within a CADD drawing. Existing materials in plan view shall be labeled and not hatched.

The hatching used for materials shall be those designated within [Chapter CADD7 – Symbols](#). Figure CADD5.4 shows examples of typical hatch patterns and their typical uses.

The colors, line weights and line types for hatching shall be those designated within [Chapter CADD6 – Layers](#) and [Chapter CADD7 - Symbols](#).

Hatching used shall be shown and described in the project legend.

Figure CADD5.4 Typical Material Hatch Patterns

Hatch Pattern	Autodesk AutoCAD Pattern Name	Typical Scale (@ 1" = 20' Horizontal. Drawing Scale)	Typical Use or Designation
	ANSI31	20	Removal
	ANSI37	20	Resurfacing, Others
	AR-CONC	0.75	Concrete Material
	DOTS	20	Pavement Material
	EARTH	20	Earth Compacted Material
	GRASS	5	Grass/Seeding Material
	GRAVEL	3	Gravel/Stone Material
	RIPRAP	10	Riprap Material

CADD5.05 Text

1. Styles, Fonts and Shape Files

All text fonts and shape files shall be a standard component of Autodesk AutoCAD or Microsoft Windows. Use of non-standard fonts is prohibited. With the exception of the Romans.shx font, only TrueType fonts shall be used.

Figure CADD5.5 shows standard text styles and fonts for use on Construction Drawings. Figure CADD5.6 shows standard text styles and fonts for use on Standard Detail Drawings.

Figure CADD5.5 Construction Drawings Standard Text Styles, Fonts and Typical Uses

CUE Text Style	Font Name	Font Type Example	Typical Example Uses	Remarks
Arial	Arial	TrueType	Proposed item labels and notes	7/64" plotted text height typical
Arial Black	Arial Black	TrueType	Bold text such as sheet and project titles	---
Dotum	Dotum	TrueType	Existing item labels, sheet title block area and property annotation, dimensions	3/32" plotted text height typical
Romans	Romans.shx	Shape	Text within linetypes for existing utilities	Not searchable in PDF and DWF plots such as TrueType fonts
Slanted	Dotum	<i>TrueType</i>	Text for property information (ex. Addresses & Owners)	21.8 deg. Oblique Angle Slant

Figure CADD5.6 Detail Drawings Standard Text Styles, Fonts and Typical Uses

CUE Text Style	Font Name	Font Type Example	Typical Example Uses	Remarks
Arial – Paper Space	Arial	TrueType	Standard Drawings and Details' Paper Space text	3/32" plotted text height
Arial – Model Space	Arial	TrueType	Standard Drawings and Details' Model Space text	3/32" (annotative) plotted text height
TNR – Small Titles	Times New Roman	TrueType	Standard Drawings and Details' Paper Space Title text	5/32" plotted text height
TNR – Large Titles	Times New Roman	TrueType	Standard Drawings and Details' Paper Space Title text	3/16" plotted text height

2. Text height

The minimum plotted height for any text on full-size, Arch D sheets shall be 3/32 inches (2.4 millimeters).

Text height and width shall be assigned equal values. Line spacing shall be equal to one half of the text height. Figure CADD5.7 shows the required or associated plotted text height for typical sheets, views and objects.

Text style and height requirements for the Title Block Area, Title Sheet, dimensions, are pre-defined within the CUE AutoCAD/Civil 3D DWG and DWT Templates.

Figure CADD5.7 Required/Associated Plotted Text Heights

Sheet, View or Object Type	Text Type	Required Plotted Text Heights (Full-Size Arch D Sheet Plots)	
		(in.)	(mm.)
General Notes or Plan Sheet	Notations (ex. General and Key notes)	7/64	2.8
Varies	Existing Item Notes, Labels and Dimensions	3/32	2.4
	Titles (ex. Map views, Details)	3/16	4.8
	Proposed Item Notes, Labels and Dimensions	7/64	2.8
Plan View	Street and Alley Names	3/16	4.8
	Addresses, Property Owners and Property Identification	7/64	2.8
Title Block	Issue Block	3/32	2.4
	Designer Identification Block, Project Identification Block, Management Block, Sheet Title Block, Sheet numbers, Drawing Area Coordinates	1/8	3.2
	Project Title, Sheet Title, Sheet Identification, Production Data Area	5/32	4.0
Schedules	Schedule Titles	1/4	6.4
	Schedule Headers	3/16	4.8
	Schedule Data	7/64	2.8

Figure CADD5.7 Required/Associated Plotted Text Heights (Cont.)

Title Sheet Drawing Area	Project Name	3/4	19.1
	FW CUE Identification, Resolution Number	1/2	12.7
	Mayor Text, Department Names,	1/4	6.4
	Staff Titles & Names	3/16	4.8
	Project Location Leader, Location Map Titles, Scale Text, City Map Numbers	1/8	3.2
Large-Scale Maps	Street Names	3/32	2.4

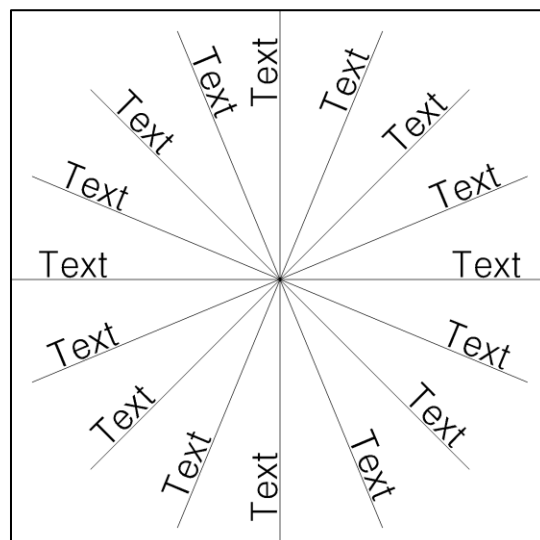
3. Text Placement

Every attempt shall be taken to avoid placing text on top of other text, lines or hatching. When placed within a patterned or hatched area, the hatching shall go around the text.

Appropriate text justification for text shall be used. For example, if text is placed to the right of an item it labels or refers to, the text shall have center left justification. If text is placed to the left of an item it labels or refers to, the text shall have center right justification.

Text shall be placed so that it is always read from the bottom or right of the sheet. When text is placed at an angle due to the angle of a feature, the Typical Text Placement Guide shown in Figure CADD5.8 should be used.

Figure CADD5.8 Typical Text Placement Guide



CADD5.06 Dimensions

Exploding dimensions or editing the dimension text is strongly discouraged except for the following: where software limitations prevent users from providing the appropriate dimensioning, where the dimension is intended to be an approximation and is notated as such, or where a dimension is displayed as a mathematical formula. Refer to Figure CADD5.9 for an example utilizing the correct dimension placement procedures.

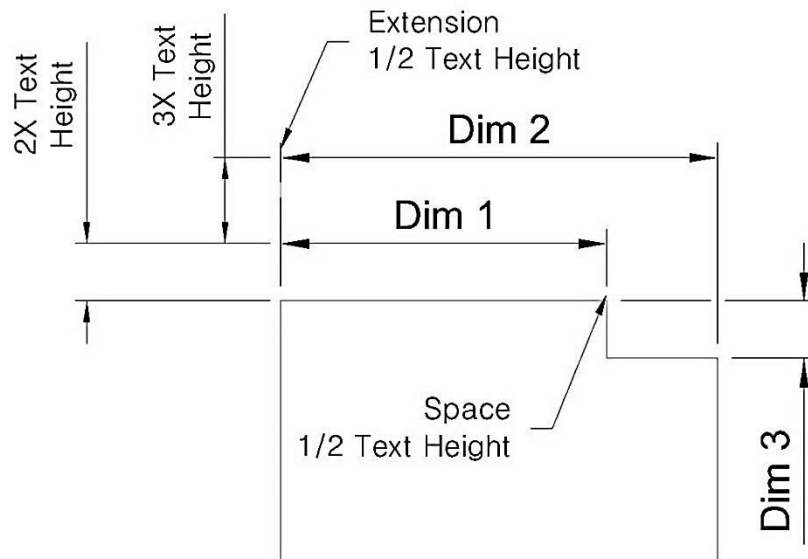
1. Dimension Lines

- Shall be placed to minimize clutter, overlapping or crossing with other dimension lines, text or graphics. When a dimension line must cross another dimension line, one of the lines shall be broken or gapped.
- Shall be created on the appropriate CUE CADD Layer.
- Shall have closed, filled arrows as terminators that consists of a 3:1 length to width ratio. The length for the arrows shall be equal to the dimension text height.
- Shall have extension lines offset from the origin (object being dimensioned) 1/16"
- Shall be offset from object lines a minimum of 9/16"
- Shall be offset from other dimension lines 3/8"
- Shall be dimensioned to the outside edge of objects such as structures and buildings.
- Shall be dimensioned to the centerline of objects such as posts and columns
- Shall be placed where dimensions of smaller components of the object are closer and the overall dimension of the object is the farthest away.
- Are available as pre-defined styles within CUE AutoCAD/Civil 3D DWG and DWT Templates.

2. Dimension Text

- Shall use a diagonal bar for textual fractions.
- Shall have a zero in front of the decimal point for decimal fractions.
- Shall be in feet and inches for architectural dimensions.
- Shall be located at the midpoint and on top of the dimension line whenever possible. If not possible, it shall be located to the side.
- Shall never be placed within and break the dimension line.
- Shall be created on the appropriate CUE CADD Layer.
- Is available as pre-defined styles within CUE AutoCAD/Civil 3D DWG and DWT Templates.

Figure CADD5.9 Dimension Example

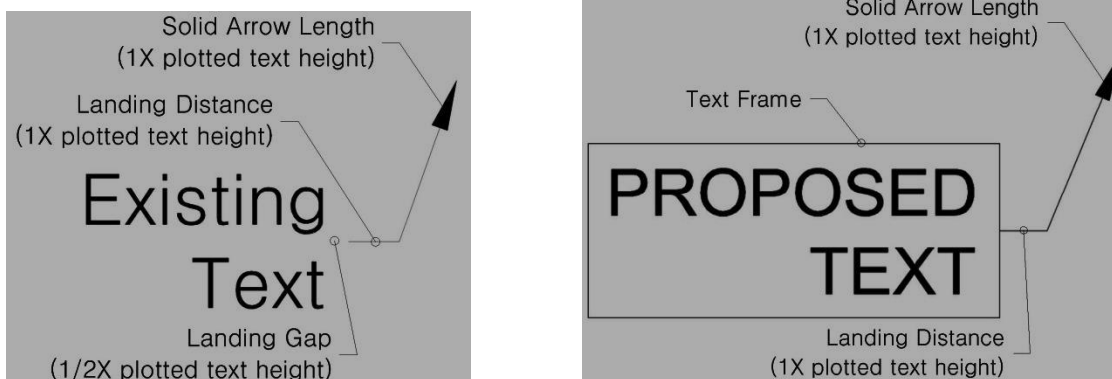


CADD5.07 Labels and Leaders

All labels and leaders shall follow the text height and style requirements set in Section CADD5.05. Labels may have straight leaders as needed for clarity purposes. Figure CADD5.10 shows examples of labels with leaders for existing and proposed items.

1. All Leaders shall have:
 - Landing Gap equal to one half of the plotted text height
 - Landing distance equal to the plotted text height
 - Solid filled arrows with length equal to the plotted text height
2. Labels with leaders for proposed items shall have:
 - A text frame with spacing between the frame and text equal to one half of the plotted text height
 - Background masking

Figure CADD5.10 Existing and Proposed Item Labels with Leaders



CADD5.08 Drafting Precision

Fractions should not be less than 1/16" unless accuracy in the field requires more precision. Decimal fractions shall always have a zero before the decimal point (ex. 0.125). Generally, architectural construction distances are shown in feet and inches (ex. 184'-6"); civil construction distances, such as those set by surveying equipment, shall be shown in decimals to the nearest hundredths (ex. 184.50').

Elevations shall be recorded to the nearest hundredths (ex. ELEV. 800.34).

Coordinates shall be rounded to the nearest ten-thousandth (ex. N= 2119866.6370, E= 477039.5160).

CADD5.09 Notations

Notations in drawings identify features, work, design discipline and indicate information required to properly construct the project to meet design specifications. Drawing notes shall match the terminology in the Master Specifications.

Notations (Notes) shall:

- Be as brief as possible; especially in tables or schedules.
- Be clear and concise.
- Use generic terms for products, materials and components.
- Minimize the use of abbreviations.
- Use consistent terms between specifications and drawings.
- Avoid repetition on a sheet.
- Eliminate broad references to the specifications (ex. "per specs").
- Use a plotted text height minimum of 3/32"
- Use paragraph spacing distance minimum of 3/32" or equal to note text height

Notes are categorized in five different types of notes:

- General Notes,
- General Discipline notes,
- General Sheet Notes, and
- Sheet Keynotes or Legend.

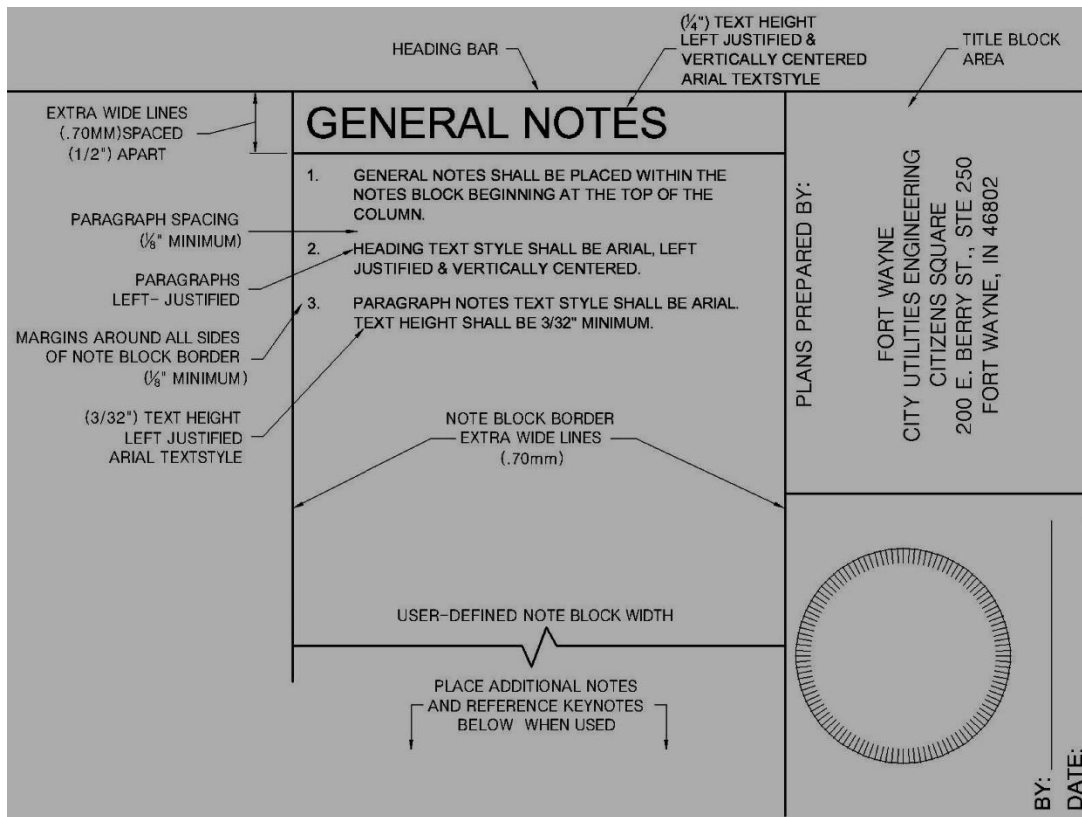
General notes, general discipline notes, and general sheet notes do not directly correspond to a graphic representation and are not directly "linked" by symbol (or other identifier) to other drawings or specifications.

Notes shall be placed within the Notes Block beginning at the top of the column. Additional notes shall be placed below the previous notes. When a notes column reaches the bottom of the sheet drawing area, additional notes shall be placed beginning at the top and left of the previous notes column as described in [Chapter CADD4 – Organization](#) and follow the notes hierarchy in the order listed below and as shown in Figure CADD5.11 and Figure CADD5.12. If a certain type of notes is not used, shift up the notes types that would normally follow underneath.

1. General Notes

General notes shall be located within the G-series, General Drawings sheet types and shall be shown on the first plan sheet (not Title Sheet), if space permits, or General Notes sheet, if necessary. General Notes shall apply to the entire construction drawings and shall not be repeated anywhere else. Whenever general notes are used, they shall be shown with a 1/4" heading of "GENERAL NOTES". All notes under the heading shall be numbered sequentially beginning at one (1) and follow the typical layout shown in Figure CADD5.11.

Figure CADD5.11 General Notes Typical Layout



2. General Discipline Notes

General discipline notes shall be located on the 0-Series sheets of a particular discipline, only apply to the sheets of that discipline and shall not be repeated anywhere else on the construction drawings. Whenever general discipline notes are used, they shall follow the same typical layout as General Notes and shall be shown with a 1/4" heading of "GENERAL (Insert Discipline) NOTES".

3. General Sheet Notes

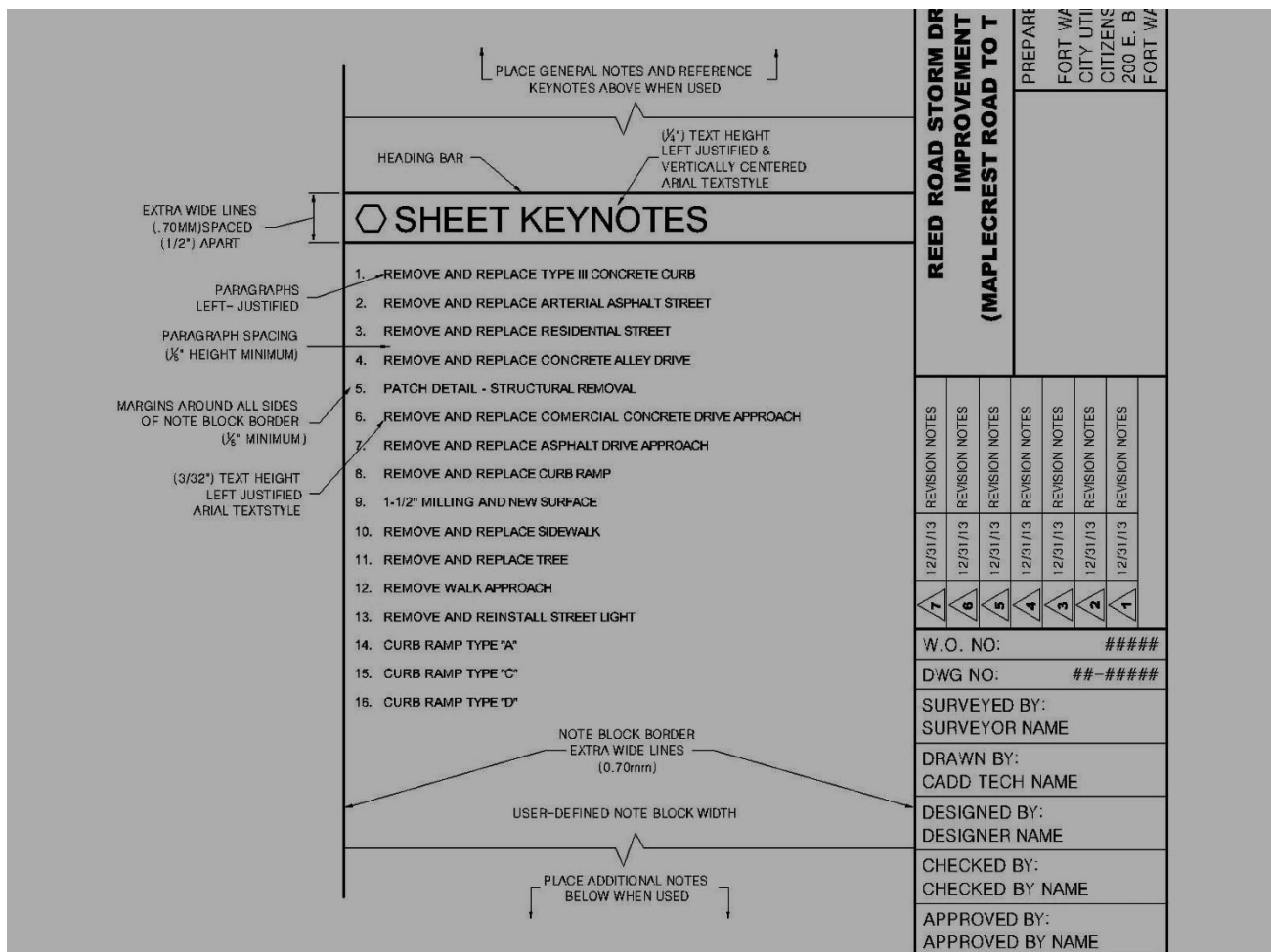
General sheet notes shall be located only on the specific sheets they apply to. Whenever general sheet notes are used, they shall follow the

same typical layout as General Notes and shall be shown with a 1/4" heading of "GENERAL SHEET NOTES".

4. Sheet Keynotes

Sheet keynotes are drawn with a hexagonal symbol containing a number or letter with leader(s) from the hexagon to the identified item and are listed in sequential order within the notes block. Whenever Sheet keynotes are used, they shall be shown with a 1/4" heading of a hexagonal symbol and "SHEET KEYNOTES" Sheet keynotes shall follow the typical layout shown in Figure CADD5.12.

Figure CADD5.12 Sheet Keynotes Example



CADD5.10 Symbols

Symbols shall be used as graphic representations of items or materials by association, resemblance or convention in accordance with [Chapter CADD7 – Symbols](#).

CADD5.11 Title Sheet Requirements

1. Title Sheet

A title sheet shall accompany all plan sets, unless otherwise approved. The Title Sheet shall include all components and requirements of the plan sheet layout, as specified in [Chapter CADD4 - Organization](#) except for the module lines and drawing area coordinates. In addition, the Title Sheet shall include other components and information within the drawing area unique to the project.

A project location map and standard north arrow shall be placed within the pre-built viewport at the accommodating preferred scale so that at least two major arterial or collector streets are shown (referenced from model space) near the project location area; preferably intersecting each other. Generally, in addition to annotation, hatching and symbols, only right-of-way lines are shown to represent streets.

A vicinity map showing the approximate project location shall be placed to the right of the project location map at the accommodating preferred scale or be labeled N.T.S (not to scale). The vicinity map shall show major arterial or collector street centerlines with street labels and be oriented with north toward the top of the sheet.

On projects with a small amount of sheets (less than 11), a sheet index schedule may be placed, centered to the right of the project location map viewport and below the vicinity map. On larger projects, the sheet index schedule should go on a separate sheet such as the sheet (layout) index sheet or general notes sheet.

The additional components and title sheet layout requirements, including layers, text styles and sizes, utility oversight board, CUE project staff names, etc., are pre-built into CUE AutoCAD/Civil 3D DWT and DWG templates. Refer to [Exhibit CADD5-1](#) for an example of a Title sheet.

CADD5.12 Sheet Types

Sheet types shall consist of scaled views and non-scaled views. Scaled views shall be plans, elevations, sections, large-scale plans, and details. Non-scaled views shall be diagrams, 3D representations, details and schedules.

Each sheet type shall include the subject matter and minimum information designated below within each sheet type requirement section. However, on small projects, different subject matter or information may be combined on the same sheet. For example, a sheet layout index and general notes may be shown on the same sheet.

In instances where subject matter or information is combined, each separate subject matter or information shall be clearly labeled.

Figure CADD5.13 (also refer to [Chapter CADD4 - Organization](#), [Figure CADD4.7](#) Sheet Type Designator) shows the different types of sheets and typical uses for each.

Figure CADD5.13 Sheet Types, Designators and Typical Uses

Sheet Type Designator	Sheet Type	Sheet Type Typical Use
0	General	(Title Sheet, symbols & legend, notes, etc.)
1	Plans	(horizontal (plan) views, plan and profile, closely associated schedules)
2	Elevations	(Vertical views)
3	Sections	(sectional views, wall sections, civil cross sections)
4	Large-Scale Views	(plans, elevations, stair sections, or sections that are not details)
5	Details	(Vertical, Horizontal, Isometric, 3D details)
6	Schedules and Diagrams	(Schedules and Diagrams)
7	User Defined	(for types that do not fall in other categories, including typical detail sheets)
8	User Defined	(for types that do not fall in other categories)
9	3D Representations	(3D Representations)

The following shall be used for minimum information necessary for each sheet type.

1. Sheet Type 0 - General

General sheets shall provide general information that applies to the entire project as well as to each discipline. These sheets shall be placed following the title sheet and at the beginning of each discipline subset. Title, General notes, general (discipline) notes, sheet list index and plan sheet layout sheets shall be considered Type 0 - General sheets. Refer to [Exhibit CADD5-1](#) and [Exhibit CADD5-2](#) for examples of general sheet types.

2. Sheet Type 1 - Plans

Plans shall consist of, but not be limited to, Civil, Landscape, Structural, Architectural, Interior, Fire Protection and Plumbing, Mechanical and Electrical plans.

A. Civil Plans

Civil Plans shall include, but not be limited to, demolition, site improvement, dimension (survey) control, grading, paving, traffic, restoration, plan and profile, erosion control, and site utilities plans. Smaller design projects may require a combination of sheet types described as part of the civil plans criteria Section CADD5.15. See Section CADD5.13 thru Section CADD5.15.

3. Sheet Type 2 - Elevations

Elevations sheets shall provide a vertical view from a side of a structure. Each elevation is labeled in relation to the direction it faces, so the 'north elevation' of a structure is the side that most closely faces north. Elevation sheets are part of architectural building drawings.

4. Sheet Type 3 – Sections

A sample cross-section sheet is provided as [Exhibit CADD5-3](#). When cross sections are required, the information to be shown shall include, but not be limited to, the following:

- Existing and proposed water mains, storm and sanitary structures, within the influence of the proposed construction.
- Property lines, easement lines, and/or right-of-way lines.
- Half-sections shown to provide driveway profiles affected by change in final topography.
- Existing gas lines, telephone conduit, etc. within the influence of the proposed construction.
- Cross-sections shall be submitted for all proposed ditch projects as well as projects including roadway or alley construction.
- Cross-sections shall be provided every 50 foot station along the proposed construction centerline or baseline or as specified by CUE.

5. Sheet Type 4 – Large-Scale Views

Large-scale views are drawings reproduced at a larger scale to provide more detailed information that cannot be accommodated at the smaller-scaled drawing. Sometimes, a large-scale view can be accommodated and shown within the same sheet that the enlarged area is located on. If this cannot be accomplished, then a type 4 sheet may be created.

Examples of large-scale views are pump or lift stations, floor plans or areas of civil plans where the amount of detail needed, requires a larger view.

Areas to be shown at a larger scale shall have a dashed line placed around the area to be enlarged. The information shall only be shown in one of the views, the large-scaled view or standard scale view. Figure CADD5-14 shows an example of a large-scale view.

Figure CADD5.14 Large-Scale View Example



6. Sheet Type 5 – Details

Details sheets shall utilize CUE standard drawings and details as listed in [Chapter CADD8 – Standard Drawings and Details](#).

Standard Drawings and Details shall be placed within the drawing area utilizing the drawing area modules specified in [Chapter CADD4 - Organization](#), Section CADD4.05 Drawing Sheet Organization. The first standard drawing and detail shall be placed on the lowest, right-most available module; usually being next to the title block area. The placement of standard drawings and details shall follow the procedure and order shown in Figure CADD5.15.

All standard drawings and details placed in the sheet drawing area shall have identifying elements such as a drawing (block) title, drawing area coordinate identifying number and a scale.

Standard drawings and details utilized which are not drawn to scale, shall be inserted at an appropriate scale to maintain readability and attempt to maintain the minimum text height requirements. Standard drawings and details which are not drawn to a standard scale shall be noted with the words "Scale: N.T.S.". If drawn to a standard scale, they shall be inserted to plot at the corresponding scale. Refer to [Exhibit CADD5-4](#) for an example of a Detail Sheet.

Figure CADD5.15 Standard Drawings and Details Identification Example

DETAIL 8	DETAIL 6	DETAIL 4	DETAIL 2	<table border="1"> <tr> <td colspan="2">PLANS PREPARED BY:</td> </tr> <tr> <td>FORM NAME:</td> <td>CITY UTILITIES DOCUMENTS</td> </tr> <tr> <td>DATE:</td> <td>DATE: 11/11/2011</td> </tr> <tr> <td>BY:</td> <td>DATE:</td> </tr> <tr> <td colspan="2">PROJECT NAME CADD PROJECT LIMITS</td> </tr> <tr> <td colspan="2">90% PLANS CONSTRUCTION</td> </tr> <tr> <td>W.C. NO:</td> <td>####</td> </tr> <tr> <td>DWG NO:</td> <td>##-####</td> </tr> <tr> <td>SUPERVISOR BY:</td> <td>SUPERVISOR NAME</td> </tr> <tr> <td>DRAWN BY:</td> <td>CADD TECH NAME</td> </tr> <tr> <td>DESIGNED BY:</td> <td>DESIGNER NAME</td> </tr> <tr> <td>CHECKED BY:</td> <td>CHECKED BY NAME</td> </tr> <tr> <td>APPROVED BY:</td> <td>APPROVED BY NAME</td> </tr> <tr> <td>DATE:</td> <td>4/20/13</td> </tr> <tr> <td colspan="2">SHEET TITLE:</td> </tr> <tr> <td colspan="2">FIGURE CADD5.15 DETAILS</td> </tr> <tr> <td colspan="2">CADD-15 SHEET 15 OF 17</td> </tr> </table>	PLANS PREPARED BY:		FORM NAME:	CITY UTILITIES DOCUMENTS	DATE:	DATE: 11/11/2011	BY:	DATE:	PROJECT NAME CADD PROJECT LIMITS		90% PLANS CONSTRUCTION		W.C. NO:	####	DWG NO:	##-####	SUPERVISOR BY:	SUPERVISOR NAME	DRAWN BY:	CADD TECH NAME	DESIGNED BY:	DESIGNER NAME	CHECKED BY:	CHECKED BY NAME	APPROVED BY:	APPROVED BY NAME	DATE:	4/20/13	SHEET TITLE:		FIGURE CADD5.15 DETAILS		CADD-15 SHEET 15 OF 17	
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FIGURE CADD5.15 DETAILS																																						
CADD-15 SHEET 15 OF 17																																						
DETAIL 7	DETAIL 5	DETAIL 3	DETAIL 1																																			

7. Sheet Type 6 – Schedules and Diagrams

Schedules shall follow the organization requirements specified in [Chapter CADD4 - Organization](#), Section CADD4.06. Schedules on Sheet Type 6 shall use linetypes, layers, text styles and text height requirements set in the respective sections of the CADD Standards. Margins around text shall equal half of the text height used within schedules.

When a particular schedule or a group of schedules encompass the majority of a sheet or is the only type of graphic information on the sheet, the sheet shall be designated as Type 6.

Examples of project schedules are Structure Data Schedules, Earthwork Summary Volume Schedules and Approach Quantity Schedules. Refer to [Exhibit CADD5-5](#) for a sample Structure Data Schedule.

8. Sheet Type 7 & 8 – User Defined

These sheets allow the user to accommodate sheet types that do not fall under any of the listed sheet types.

9. Sheet Type 9 – 3D Representations

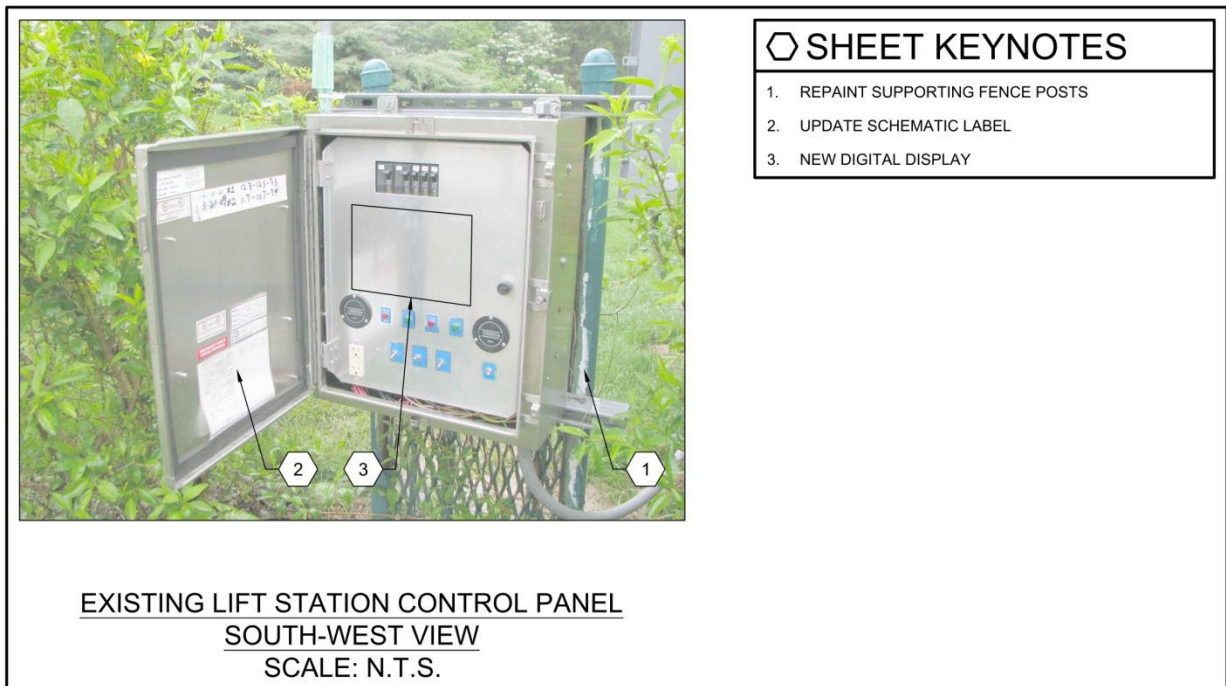
Sheet Type 9 consists of isometric, diametric, trimetric, oblique views of drawings, perspectives, and photographs. These types of drawings and documents can be used to aid in showing different sides, angles and aspects of the desired design.

When 3D representations are used, a title, scale and direction of view must be noted. If the 3D representation is not to scale, it shall be noted with the words "Scale: N.T.S.".

Digital pictures created from photographs may be inserted into computer programs and used as a background overlaid with the new Work. Figure CADD5.16 shows an example of a photograph used to depict proposed work.

A cross-reference symbol shall be shown on the plans, sections or elevations when utilizing photographs to denote where and at what angle the photograph was taken.

Figure CADD5.16 Photograph Example



CADD5.13 Civil Plans – Plan View Criteria/Requirements

A sample plan view is provided in [Exhibit CADD5-6](#). The information which appears on the plan view shall include, but is not limited to, the following:

1. The size, location, and direction of flow for all existing pipes, culverts and appurtenances shall be labeled.
2. The size, location, direction of flow and description for all proposed infrastructure with appropriate stations shall be labeled.
3. Field references to control points in the plan view.
 - A. Permanent horizontal and vertical control shall be accurately plotted and labeled on the plans.
 - B. A description and location of each control points including its station and offset relative to the proposed lines shall be also given.
 - C. References to project control point descriptions shall be shown on its own separate survey control plan. Refer to Section CADD5.15, item 1 for survey control plan requirements.
4. Delta or deflection angles for proposed alignments with the bearing direction and northing and easting coordinates, if applicable. All angles shall be shown to the nearest second.
5. The location of the centerline for the proposed improvements shall be referenced by dimensions to the nearest easement lines, right-of-way lines or property lines and to the nearest control points.
6. Mailboxes, houses, fences and drives for a minimum of 50 feet beyond the right-of-way or to the fronts of the houses for proposed lines located within the right-of-way. Topographic features to the extent that they may be pertinent to the improvement location or construction.
7. Trees with a designation of type, size and drip line limits.
8. Property lines, lot lines, easement lines and other boundary lines to a minimum of 50 feet beyond any right-of-way. In instances where additional information might be required, the limit shall be extended.
9. Generally, only the outside lines of a pipe on the plans. However, a thin centerline shall be shown within these outside lines where any of the following conditions exist:
 - A. A distance is shown from a point or line to the centerline of the pipe.
 - B. The delta or deflection angle is shown.
10. The toe of slope and top of bank lines for ditches and channels. The width of the paved ditch area, where a paved ditch exists.
11. Structure Inventory Program Identification Number (as supplied by CUE).
12. The Deed Book, Page Number and dimensions shall be shown for existing Sewer or Drainage Easements which are impacted by sewer construction.
13. Easements and right-of-way, property line dimensions when adjacent to the proposed improvements.
14. Street right-of-way widths adjacent to and after the street name. For example: "COLDWATER ROAD 50' R/W" (if uniform width) or "COLDWATER ROAD (R/W varies)" (when dimension of the width is not uniform).

15. When existing topography within the proposed improvements route of construction are to remain in place, a note depicting the appropriate action, such as “Protect”, “Do Not Remove” or “Do Not Disturb”, shall be used and included as part of the sheet legend.
16. Street number and property owner name(s) for all private and commercial parcels within the building footprint and drawn parallel to the street(s).
17. The soil boring locations shall be shown in plan view.
18. The following note shall be placed on the General Notes sheet and the first plan sheet to notify the Contractor of the procedure required for the location of utilities prior to construction:

“NOTE - CAUTION EXISTING UTILITIES:

THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL-INCLUSIVE. LOCATION, SIZE AND MATERIAL SHOWN ON UTILITIES ARE FROM AVAILABLE RECORDS AND AVAILABLE FIELD MARKINGS, SUPPLIED BY THE RESPECTIVE UTILITY COMPANY. THE INDIANA UNDERGROUND PLANT PROTECTION SERVICE (IUPPS) MUST BE NOTIFIED 48 HOURS PRIOR TO ANY EXCAVATION FOR VERIFICATION OF LOCATION, SIZE AND MATERIAL FOR EXISTING UNDERGROUND UTILITIES (1-800-382-5544 OR 811). THE CONTRACTOR SHALL PROMPTLY NOTIFY THE ENGINEER IN WRITING IF ANY UNDERGROUND STRUCTURE OR UTILITY DIFFERS MATERIALLY FROM THE CONDITIONS SHOWN ON THE PLANS AS TO IMPACT THE WORK.”

19. Grading Plans

The grading plans shall include the following information:

- A. Site grading with controlling grades to assure proper drainage. Critical spot elevations must be positioned relative to a survey control point, structure, or road baseline.
- B. Limits of grading work.
- C. Sizes of new drainage facilities with controlling grades.
- D. Modified contours for the new design.
- E. Ensure positive drainage to structures and other discharge points.
- F. Spot elevations at corners and points adjacent to building entrances.

CADD5.14 Civil Plans – Profile View Criteria/Requirements

A sample profile view to be included on all plan and profile sheets is depicted in [Exhibit CADD5-7](#). The information to appear in the profile view shall include, but not be limited to, the following:

1. The grid shall be set up on a 1” = X’ basis.
2. The limits, by station, for all concrete caps, cradles and encasements, tunnels and bored segments.
3. When the proposed line improvement crosses a right-of-way, delineate the limits of the right-of-way and label the width.

4. The type of backfill material under the roadway pavement and its limits.
5. The pipe length, size, material, grade, and ASTM or AASHTO designation and pipe classification shall be indicated between all structures. This information shall be parallel to and labeled above or below smaller pipes. However, on pipes of sufficient diameter, this information shall be placed inside and at the center of the pipe segment. Grades shall be shown as a percent. (i.e. *"128 L.F. OF 12" SDR35 PVC @ 0.50 %."*)
6. Invert elevations shall be placed at the following locations:
 - A. All breaks in the grade.
 - B. Breaks necessary for profile continuation onto another sheet.
 - C. All pipes entering and exiting proposed structures.
 - D. Other conduits critical to the pipe gradient.
 - E. Pipe intersections.
 - F. All locations necessary to substantiate the profile grade.
 - G. Both pipe invert edges when there is a drop or slant inlet.
 - H. Other conditions shown on the typical drawings.
 - I. Each catch basin or surface inlet connection.
7. Proposed manhole and surface inlet grates rim elevations shall be shown to the nearest hundredth. The water surface elevations of ponding and/other 100-year floodway and flood plain elevation with zone description.
8. Borings, if required or completed, indicating depths and type of soils encountered shall be shown if not shown on a separate soils sheet.
9. The flow line of all existing and proposed ditches shall be plotted and labeled as flow line ditch, left or right. Also a label identifying the ditch slope shall be provided. On large channels, it may be necessary to show the left and right tops of bank.
10. Existing ground profile shall be labeled, including any proposed street grades or improvements.
11. Basement floor elevations, when applicable, otherwise the first floor elevations. Assumed basement floor elevation shall be noted on the profile using the word "Assumed" adjacent to the elevation.
12. Any existing underground utility, when crossing a proposed improvement.

CADD5.15 Miscellaneous Civil Plans Criteria/Requirements

1. Layout Index Sheet Plans

A layout index sheet shall be prepared to identify the location of the proposed improvements shown on each plan sheet. The location shall be shown on a map covering the entire project area at an appropriate scale. The map shall show, at a minimum, the public right-of-way, roadway labels, north arrow, graphical and textual scale and labeled polygons/figures designating the proposed improvement area covered by each plan drawing view.

If the profile is on a separate sheet, the layout index sheet shall include a reference to the location of the profile for the utility lines on each plan sheet. For some projects, the layout index sheet may be shown on the

project location map which is located on the title sheet. See [Exhibit CADD5-8](#) for an example of a layout index sheet.

2. Dimension (Survey) Control or Layout Plans

The dimension (survey control) plans shall include the following information:

- A. Base plans showing information from field survey including benchmark and survey control point locations.
- B. Interrelationships of buildings, streets, parking areas, fences, and utilities.
- C. Locations for access and egress to facilities.
- D. Location and limits of site improvements.
- E. Standards for Dimension Control or Layout Plans (i.e. witnesses, control points, benchmarks and temporary bench marks).
- F. Structures should be located by horizontal coordinates where possible.

[Exhibit CADD5-9](#) shows an example of a survey control plan sheet.

3. Erosion Control Plans

Erosion and sediment control plans shall minimize the areas of disturbed soils and the duration of exposure. The erosion control plan design shall provide measures to control water at upslope site perimeters, control water on-site, control sediment on-site, and control sediment at the downslope site perimeters. Refer to [Exhibit CADD5-10](#) for a sample erosion control plan sheet.

4. Traffic Control Plans

Traffic control plans shall be prepared and obtain City's approval of that plan when construction, repair, or maintenance work is to be conducted within the City's right-of-way. The plan shall be consistent with the provisions found in the Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways. Refer to [Exhibit CADD5-11](#) for a sample traffic control plan sheet.

5. Demolition Plans

The demolition plans shall include but not be limited to the following information:

- A. Limits of items to be removed from the site.
- B. Curbs to be cut.
- C. Items to be demolished and removed from site.
- D. Items to be salvaged and turned over to owner.
- E. Items to remain undisturbed and be protected.

See [Exhibit CADD5-12](#) and [Exhibit CADD5-13](#) for examples of demolition plans for different design elements.

6. Restoration and Paving Plans

The restoration plans shall include but not be limited to the following information:

- A. Show the proposed design information, including new structures, new curb limits, location for ADA ramps, limits of new pavement restoration with dimensions, etc.
- B. Limits of what areas are to be restored, and the boundaries of the site. Discuss the timing and sequence of the restoration effort.
- C. Label the existing right-of-way, property lines, and easements.

See [Exhibit CADD5-14](#) for an example of restoration plans for different design elements.

The paving plans shall include but not be limited to the following information:

- A. Large paved areas. Locate by establishing a baseline.
- B. Roads. Locate based on a centerline horizontal alignment.
- C. Paving. Indicate types.
- D. Core lines and expansion, contraction, and control joints. Dimension each item to the nearest fixed point.

7. Pavement Marking and Signage Plans

The signing plan sheet shall provide a location and a legend describing if the sign being installed is new, reset, replaced, removed or used as is. All pavement markings in the plans shall describe the type of marking and all lane widths, including turn lanes. Wherever there is a change in the pavement marking pattern, note the beginning and end stations for the transition area. The pavement marking types and sign detail shall be approved by the City of Fort Wayne and comply with MUTCD requirements. See [Exhibit CADD5-15](#) for an example of pavement markings and signage plan sheet.

CADD5.16 Electrical Plans Criteria/Requirements

Electrical plans shall consist of the design requirements for sanitary wastewater lift stations. [Exhibit CADD5-16](#) shows a sample electrical plan sheet.

At a minimum, electrical plans shall locate the lift station control panel, receptacles, portable generator connection, outlets, electrical panels, junction boxes, motors, switch gear, transformers, emergency generators, communication equipment and other components of the electrical power system.

Electrical plans shall include these items superimposed on Architectural backgrounds.